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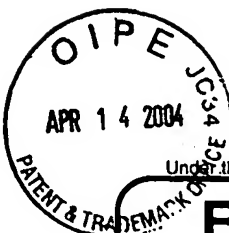
TRANSMITTAL FORM (to be used for all correspondence after initial filing)	Application Number	10/085,203	RECEIVED APR 16 2004 Technology Center 2600
	Filing Date	February 27, 2002	
	First Named Inventor	Joseph A. Kwak	
	Art Unit	2662	
	Examiner Name	Saba Tsegaye	
Total Number of Pages in This Submission	Attorney Docket Number	I-2-0203.3US	

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Date	April 12, 2004	

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FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$)**330.00**

Complete if Known

Application Number	10/085,203
Filing Date	February 27, 2002
First Named Inventor	Joseph A. Kwak
Examiner Name	Saba Tsegaye
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Technology Center 2600

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☒ Deposit Account:

Deposit Account Number: **09-0435**
Deposit Account Name: **InterDigital Communications Corporation**

The Director is authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☒ Credit any overpayments

☒ Charge any additional fee(s) or any underpayment of fee(s)

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	
SUBTOTAL (1)				(\$)	

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims - Extra Claims = X Fee from below = Fee Paid
Independent Claims - = X =
Multiple Dependent = =

Large Entity		Small Entity		Fee Description
Fee Code	Fee (\$)	Fee Code	Fee (\$)	
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

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FEE CALCULATION (continued)

3. ADDITIONAL FEES

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Fee Code	Fee (\$)	Fee Code	Fee (\$)	

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for ex parte reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	330.00
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

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*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$)**330.00**

SUBMITTED BY		(Complete if applicable)	
Name (Print/Type)	Jeffrey M. Glabicki	Registration No. (Attorney/Agent)	42,584
Signature		Telephone	215-568-6400
		Date	April 12, 2004

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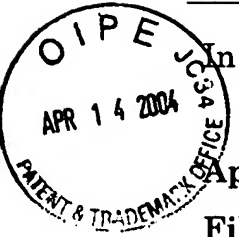
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#15

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



In the PATENT APPLICATION of:

Joseph A. Kwak

Application No.: 10/085,203

Filed: February 27, 2002

For: IMPLEMENTING A PHYSICAL LAYER
AUTOMATIC REPEAT REQUEST
FOR A SUBSCRIBER UNIT

Group: 2662

Examiner: Saba Tsegaye

Our File: I-2-0203.3US

Date: April 12, 2004

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APPEAL BRIEF

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Sir:

Further to the February 12, 2004 Notice of Appeal, Applicant hereby submits this
Appeal Brief.

04/14/2004 SZEWDIE1 00000113 090435 10085203

01 FC:1402 330.00 DA



Applicant: Joseph A. Kwak
Application No.: 10/085,203

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APPENDIX A - Pending Claims

9-13

(1) REAL PARTY IN INTEREST

The real party in interest is the assignee of record, InterDigital Technology Corporation.

(2) RELATED APPEALS AND INTERFERENCES

A Notice of Appeal was filed on February 12, 2004 for U.S. Patent Application No. 09/939,410 which is the parent of the present application. Other than that appeal no other appeals or interferences are known which will directly affect or be directly affected by or have a bearing on the Board's decision in the present appeal.

(3) STATUS OF THE CLAIMS

Claims 1-23 are the subject of this appeal and are attached in Appendix A. No other claims are pending. Claims 7, 8 and 10-12 are finally rejected under 35 U.S.C. §102(e), as being anticipated by U.S. Patent No. 6,208,663 (Schramm et al.). Claim 9 is finally rejected under 35 U.S.C. §103(a), as being unpatentable over Schramm et al. in view of U.S. Patent No. 6,128,276 (Agee). Claims 1, 2, 5 and 6 are finally rejected under 35 U.S.C. §103(a), as being unpatentable over U.S. Patent No. 6,529,561 (Sipola) in view of Schramm et al. Claims 13-15 and 21-23 are finally rejected under 35 U.S.C. §103(a), as being unpatentable over U.S. Patent No. 6,021,124 (Haartsen) in view of Schramm et al. Claims 18-20 are finally rejected under 35 U.S.C. §103(a), as being unpatentable over Haartsen in view of Schramm and further in view of Sipola. Claims 16 and 17 are finally rejected under 35 U.S.C. §103(a), as being unpatentable over Haartsen in view of Schramm et al. and further in view of U.S. Patent No. 6,522,650 (Yonge, III et al.). Claims 3 and 4 are finally rejected under 35 U.S.C. §103(a), as being unpatentable over Sipola in view of Schramm et al and further in view of Agee.

(4) STATUS OF THE AMENDMENTS

No Amendments were filed after the November 13, 2003 Final Action.

(5) SUMMARY OF THE INVENTION

A subscriber unit implements a physical layer automatic repeat request. A transmitter of the subscriber unit has a physical layer transmitter for receiving data (such as blocks 34a of Figure 3, see, for instance, paragraph [0028]), formatting the received data into packets (such as N-Channel Sequencer 36 of Figure 3 see, for instance, paragraph [0028]). Each packet has a particular encoding/data modulation (such as AMC Control 26C and Physical Layer ARQ Xmitter 26A of Figure 1B, see, for instance, paragraph [0024]). The transmitter transmits the packets and retransmits packets in response to failure to receive a corresponding acknowledgment for a given packet (See, for instance, paragraph [0019]).

An acknowledgment receiver receives the corresponding acknowledgment (such as ACK Receiver 26B). An adaptive modulation and coding controller collects retransmission statistics and adjusts the particular data encoding/modulation using the collected statistics (such as by AMC Control 26C of Figure 1B, see, for instance, paragraph [0021]). If the collected statistics indicate a low number of retransmissions, a higher capacity encoding/modulation scheme is selected as the particular encoding/data modulation (See, for instance, paragraph [0021]). If the collected retransmission statistics indicate a high number of retransmissions, a lower capacity encoding/data modulation scheme is selected as the particular encoding/data modulation (See, for instance, paragraph [0021]).

The subscriber unit also comprises a receiver having a physical layer receiver for demodulating the packets (such as Physical Layer ARQ Receiver 16A, see, for instance, paragraph [0017]). A combiner/decoder buffers, decodes and detects packet errors (such as Hybrid ARQ Decoders 50 of Figure 3, see, for instance, paragraph [0029]). An acknowledgment generator generates an acknowledgment for each packet if that packet has

an acceptable error rate (such as ACK Xmitter 54 of Figure 3, see, for instance, paragraph [0029]).

(6) ISSUES

- (1) Do claims 7, 8 and 10-12 meet the requirements of 35 U.S.C. §102(e), as not being anticipated by U.S. Patent No. 6,208,663 (Schramm et al.)?
- (2) Does claim 9 meet the requirements of 35 U.S.C. §103(a), as being unpatentable over Schramm et al. in view of U.S. Patent No. 6,128,276 (Agee)?
- (3) Do claims 1, 2, 5 and 6 meet the requirements of 35 U.S.C. §103(a), as being unpatentable over U.S. Patent No. 6,529,561 (Sipola) in view of Schramm et al.?
- (4) Do claims 13-15 and 21-23 meet the requirements of 35 U.S.C. §103(a), as being unpatentable over U.S. Patent No. 6,021,124 (Haartsen) in view of Schramm et al.?
- (5) Do claims 18-20 meet the requirements of 35 U.S.C. §103(a), as being unpatentable over Haartsen in view of Schramm and further in view of Sipola?
- (6) Do claims 16 and 17 meet the requirements of 35 U.S.C. §103(a), as being unpatentable over Haartsen in view of Schramm et al. and further in view of U.S. Patent No. 6,522,650 (Yonge, III et al.)?
- (7) Do claims 3 and 4 meet the requirements of 35 U.S.C. §103(a), as being unpatentable over Sipola in view of Schramm et al and further in view of Agee?

(7) GROUPING OF CLAIMS

The claims on appeal consist of four groups. Claims 1, 2, 6-8 and 12-20 are in group one and claim 1 is the representative claim. Claims 3, 9 and 21 are in Group 2 and claim 3 is

the representative claim. Claims 4, 10 and 22 are in Group 3 and claim 4 is the representative claim. Claims 5, 11 and 23 are in Group 4 and claim 5 is the representative claim.

(8) ARGUMENT

Background

This application (U.S. Patent Application No. 10/085,203) was filed on February 27, 2002.

Group 1 (Claims 1, 2, 6-8 and 12-20):

Issue (1): Do claims 7, 8 and 10-12 meet the requirements of 35 U.S.C. §102(e), as not being anticipated by U.S. Patent No. 6,208,663 (Schramm et al.)?

Schramm et al. describes a change in FEC coding and/or modulation scheme at column 7, lines 1-12 as follows.

If the quality of the connection is not sufficient for the current FEC coding and/or modulation scheme, then RBS 22 will select an alternate scheme for retransmission processing, in this example QPSK modulation, which is designed to have improved noise and/or interference resistance. For example, RBS 22 can count the number of requests for retransmitted blocks and only use the alternative FEC coding and/or modulation scheme when the counted number of erroneously transmitted blocks exceeds some predetermined threshold. If desired, the alternative FEC coding and/or modulation scheme can be implemented each time a retransmitted block is requested, i.e., the case where the predetermined threshold is zero.

(Emphasis Added). Essentially, Schramm et al. discloses that after transmission of a block fails a specified number of times, the block is transmitted using an alternate scheme having improved noise and/or interference rejection. Applicants respectfully disagree that counting a number of failed attempts of retransmitting a given packet constitutes “collecting retransmission statistics.” Furthermore, the present invention adjusts to a higher capacity encoding/data modulation scheme in response to a low number of retransmission statistics.

The scheme of the present invention allows for the system to achieve an optimum encoding/data modulation scheme using retransmission statistics. Applying Schramm et al. to a low retransmission environment would result in either no change to the scheme (the threshold not being exceeded) or, ironically, to a lower capacity scheme (if a retransmission is required and the threshold is exceeded). Accordingly, Schramm et al. would never move to a higher capacity scheme based on acknowledgements or negative acknowledgements.

An argument was set forth that the resetting of the FEC/modulation scheme in Schramm is analogous to the lowering the modulation/coding scheme of the present invention. However, the present invention uses the retransmission statistics to adjust the encoding/modulation scheme. This is clearly different to resetting the scheme for each block of Schramm, which is performed automatically after a successful transmission.

With respect to issues 2-7, none of the additional references, Agee, Sipola, Haartsen and Yonge, III et al., cure this lack of Schramm's teaching. Accordingly, these claims meet the requirements of 35 U.S.C. §102(e) and 35 U.S.C. §103(a).

Group 2 (Claims 3, 9 and 21):

With respect to Group 2, Agee is cited as disclosing the Orthogonal Frequency Division Multiple Access (OFDMA) elements of the claims. Although Agee mentions OFDMA in passing in Columns 4 and 5, it does disclose nulling sub-channels or, in particular, the nulling of the sub-channels as the adjusting of the modulation and coding scheme as previously described in context with Group 1.

Group 3 (Claims 4, 10 and 22):

With respect to Group 3, Schramm is cited as disclosing the use of single carrier-frequency division equalization (SC-FDE). However, Schramm does not even mention SC-FDE, except that "the present invention is readily applied to all types of access

methodologies” at column 4, lines 51-53. Accordingly, Schramm does not even disclose an SC-FDE system.

Group 4 (Claims 5, 11 and 23):

With respect to Group 4, these claims recite using a fast feedback channel for the acknowledgements, which is not disclosed in Schramm et al. or the other cited references. The use of the fast feedback channel allows for fast acknowledgement and fast adaptation of the encoding/modulation scheme to the channel conditions as reflected by the fast accumulating retransmission statistics.


(9) CONCLUSION

For the reasons stated above, pending claims 1-23 meet the requirements 35 U.S.C. §102(a) and 35 U.S.C. §103(a). Accordingly, the final rejection should be reversed. After reversal, Applicant respectfully requests that the pending claims be passed to allowance.

Respectfully submitted,

Joseph A Kwak

By:


Jeffrey M. Glabicki
Registration No. 42,584
(215) 568-6400

Volpe and Koenig, P.C.
United Plaza, Suite 1600
30 South 17th Street
Philadelphia, PA 19103
JMG

APPENDIX A
(PENDING CLAIMS OF U.S. PATENT APPLICATION NO. 10/085,203)

1. A subscriber unit implementing physical layer automatic repeat request, comprising:

a transmitter having:

a physical layer transmitter for receiving data, formatting the received data into packets, each packet having a particular encoding/data modulation, transmitting the packets, and retransmitting packets in response to failure to receive a corresponding acknowledgment for a given packet;

an acknowledgment receiver for receiving the corresponding acknowledgment; and

an adaptive modulation and coding controller for collecting retransmission statistics and adjusting the particular data encoding/modulation using the collected statistics; wherein if the collected statistics indicate a low number of retransmissions, a higher capacity encoding/modulation scheme is selected as the particular encoding/data modulation and if the collected retransmission statistics indicate a high number of retransmissions, a lower capacity encoding/data modulation scheme is selected as the particular encoding/data modulation; and

a receiver having:

a physical layer receiver for demodulating the packets;

a combiner/decoder for buffering, decoding and detecting packet errors; and

an acknowledgment generator for generating an acknowledgment for each packet if that packet has an acceptable error rate.

2. The subscriber unit of claim 1 wherein the particular encoding/data modulation is forward error correction (FEC).

3. The subscriber unit of claim 2 wherein the packets are transmitted using an orthogonal frequency division multiple access (OFDMA) air interface and the FEC

encoding/data modulation adjusting is performed in addition to selective nulling of subchannels in an OFDMA set.

4. The subscriber unit of claim 1 wherein the packets are transmitted using a single carrier having a frequency domain equalization (SC-FDE) air interface.

5. The subscriber unit of claim 1 whereby the subscriber unit uses a code division multiple access (CDMA) air interface and wherein the acknowledgments are transmitted on a fast feedback channel.

6. The subscriber unit of claim 1 whereby the acknowledgment generator transmits a negative acknowledgment if any packet has an unacceptable error rate.

7. Physical automatic request repeat apparatus employed by a subscriber unit, comprising:

- a transmitter having:
- means for receiving data;
- means for formatting the received data into packets for transmission, each packet having a particular encoding/data modulation;
- means for transmitting the packets;
- means for retransmitting a packet, if an acknowledgment for that packet is not received;
- means for collecting retransmission statistics; and
- means for adjusting each particular data modulation using the collected retransmission statistics; wherein if the collected statistics indicate a low number of retransmissions, a higher capacity encoding/modulation scheme is selected as the particular encoding/data modulation and if the collected retransmission statistics indicate a high number of

retransmissions, a lower capacity encoding/data modulation scheme is selected as the particular encoding/data modulation; and

a receiver having:

means for receiving packets;

means for decoding and error checking each received packet; and

means for generating an acknowledgment at the physical layer if that received packet has an acceptable error rate.

8. The subscriber unit apparatus of claim 7 wherein the particular encoding/data modulation is forward error correction (FEC).

9. The subscriber unit apparatus of claim 7 wherein the packets are transmitted using an orthogonal frequency division multiple access (OFDMA) air interface and the FEC encoding/data modulation adjusting is performed in addition to selective nulling of subchannels in an OFDMA set.

10. The subscriber unit apparatus of claim 7 wherein the packets are transmitted using a single carrier having frequency domain equalization (SC-FDE) air interface.

11. The subscriber unit apparatus of claim 7 wherein the acknowledgments are transmitted using a code division multiple access (CDMA) air interface on a fast feedback channel.

12. The subscriber unit apparatus of claim 7 whereby said whereby said means for generating generates a negative acknowledgment if a packet has an unacceptable error rate.

13. A subscriber unit for supporting broadband wireless communications comprising:

a sequencer having a queue for receiving data blocks from a communication network and for sequentially conveying packets to n transmitters;

n transmitters for transmitting said packets through a data channel;

n receivers for receiving return packets through said data channel; and

n hybrid ARQ decoders, each coupled with one of said n receivers;

whereby said n hybrid ARQ decoders have a feedback channel for transmitting an acknowledgment when a packet having an acceptable error rate has been received, and for releasing packets which have an acceptable error rate; whereby if a low number of retransmissions occurs, a higher capacity encoding/modulation scheme is selected to transmit said packets through the data channel and if a high number of retransmissions occur, a lower capacity encoding/data modulation scheme is selected to transmit said packets through the data channel.

14. The subscriber unit of claim 13 wherein said n signal transmitters each temporarily store a packet that has been transmitted in a buffer memory; whereby each of said n transmitters clear the stored packet in readiness for receipt of another block when an acknowledgement signal for the stored packet has been received at one of said n receivers.

15. The subscriber unit of claim 13 wherein said n transmitters each temporarily store a packet that has been transmitted in a buffer memory; whereby said n transmitters retransmits the packet temporarily stored in its buffer memory when an acknowledgement signal for the stored packet has not been received at one of said n receivers.

16. The subscriber unit of claim 13 wherein each of said n transmitters clears its buffer memory if an acknowledgement signal is not received after a maximum number of retransmissions.

17. The subscriber unit of claim 16 wherein the maximum number of retransmissions is an operator defined integer having a range from 1 to 8.

18. The subscriber unit of claim 13 wherein each of said n receivers combine a retransmitted packet with an original transmitted packet to facilitate error correction.

19. The subscriber unit of claim 13 wherein a transmitter failing to receive an acknowledge signal encodes the packet by employing a different encoding technique from an encoding technique employed in an original transmission of that packet.

20. The subscriber unit of claim 13 wherein each of the n transmitters employs turbo coding and each of the n decoders employ code combining of an original transmission and a retransmission to facilitate error correction.

21. The subscriber unit of claim 13 wherein the packets are transmitted using an orthogonal frequency division multiple access (OFDMA) air interface in which frequency subchannels in an OFDMA set may be selectively nulled.

22. The subscriber unit of claim 13 wherein the packets are transmitted using a single carrier having a frequency domain equalization (SC-FDE) air interface.

23. The subscriber unit of claim 13 wherein the acknowledgments are transmitted on a fast feedback channel using a code division multiple access (CDMA) air interface.